New Millennium DS2

Fabrication Lessons Learned from an Advanced Packaging Technology Project

New Millennium Deep Space 2 (DS2) is the second project of the New Millennium Program managed by the Jet Propulsion Laboratory (JPL). The project consists of a pair of probes that are carried by the Mars Polar Lander. Launched in January, 1999, these probes will be released from the Lander cruise stage, autonomously enter the Mars atmosphere, impact and penetrate the Martian surface. After impact, a soil sample is taken and analyzed for the presence of water. Other scientific data is collected during descent and after impact.

Mars Microprobe

The size and mass of the probes imposed enormous constraints on the packaging of the electronics. To satisfy these constraints, DS2 became a virtual advanced packaging experiment: Chip-on-Board (COB) technology, High Density Interconnect (HDI) technology, high density surface mount designs and novel flexible interconnects were used in a highly integrated package, forming the basis for the DS2 electronics.

As expected, a number of problems were encountered during the development phases of this unique spacecraft. Some of these problems were resolved in unique ways, and generated a number of "lessons learned." This presentation describes the DS2 packaging development, with specific emphasis on these lessons learned. In addition, based on the DS2 development experience, observations are made regarding possible future directions for spacecraft fabrication.